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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/967,183	09/28/2001	Hannu Paananen	14765	5969

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SCULLY, SCOTT, MURPHY & PRESSER
400 Garden City Plaza
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EXAMINER

MCINTOSH III, TRAVISS C

ART UNIT

PAPER NUMBER

1623

DATE MAILED: 11/20/2002

8

Please find below and/or attached an Office communication concerning this application or proceeding.

File Copy

Office Action Summary

Application No.

09/967,183

Applicant(s)

PAANANEN ET AL.

Examiner

Traviss C McIntosh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 and 6. 6) ☐ Other: _____

Detailed Action

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

Acknowledgement is made of the Information Disclosure Statement filed January 23, 2002, paper number 3, and April 22, 2002, paper number 6 and the references are being taken into consideration in light of what was supplied in English.

Claim Objections

Claim 9 is objected to because of the following informalities: there is missing punctuation at the end of the sentence. Appropriate correction is required.

Claim 37 is objected to because of the following informalities: there is a spelling error wherein the claim states "in at least **on** column". It is noted that the examiner reads the claim as "in at least **one** column" Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 1-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "weakly" in claims 1, 8, 10, 17-19, 28, 29, 36, and 37 is a relative term which renders the claim indefinite. The term "weakly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention.

The term "strongly" in claims 9, 17, 18, 38, and 39 is a relative term which renders the claim indefinite. The term "strongly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention.

Claims 1, 8-10, 17-19, 28, 29, and 36-39 contain the phrase "a weakly acid cationic exchange resin" and/or "a strongly acid cation exchange resin". It is unclear as what is meant by a weakly or strongly acid cation exchange resin. An acid cation exchange resin can be weak or strong, but it is unclear what is meant by weakly and strongly. Clarity is respectfully requested.

Claims 8 and 9 recite the limitation "one column" in the first line of the claim. There is insufficient antecedent basis for this limitation in the claim. There is no reference to a column in the claim or any claim which it depends from.

Claim 11 reads, "the resin is derived from ... buthyl acrylate methyl methacrylate". It is unclear what **buthyl** is meant to encompass. Additionally, as there is no punctuation between buthyl acrylate and methyl methacrylate and it is unclear if this is meant to be one compound, or

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if there is a comma missing in the group. Appropriate correction and clarity is respectfully requested.

Claims 12 and 13 “the resin is in the form of Na⁺, K⁺...”. It is unclear how the resin can be in the form of a sodium ion, or a potassium ion. The resin may have sodium ions and/or potassium ions incorporated therein, but it is unclear how a resin can be in the form of said elements. Clarity is respectfully requested.

Claim 20 recites the limitation “**between** the columns” in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim. There is no reference to multiple columns in the claim or any claim which it depends from.

Claims 21-23 all recite “prior to feeding the fraction to the **next** chromatographic column, said fraction is concentrated by evaporation”. It is unclear which column is the **next** column. Without exact representation of which column is intended as the **next** column, it is unclear as what is meant to be encompassed by the claims of the instant application. Clarity is respectfully requested.

Claim 24 recites the limitation “the **next** column” in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim. There is no reference to multiple columns in the claim or any claim which it depends from.

Claim 25 is not a grammatically correct sentence and it is unclear as to what is meant to be encompassed by “the multistep process further comprises crystallization, ion exchanger precipitation”. Clarity is respectfully requested.

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Claim 28 recites the limitation that the particle size is 10 to 2000 μ m. It is unclear as what is meant to be encompassed wherein 10 has no unit of measure associated with it. Clarity is respectfully requested.

Claim 29 recites the limitation that the particle size is 100 to 400 μ m. It is unclear as what is meant to be encompassed wherein 100 has no unit of measure associated with it. Clarity is respectfully requested.

Claims 29 and 30 recite the limitation "feed solution" in the first line of the claims. There is insufficient antecedent basis for this limitation in the claim. There is no reference to feed solution in the claims or any claim which they depend from.

All claims which depend from a rejected claim are rejected as well.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heikkilä et al. (4,359,430).

Do to the confusing nature of the claims as noted above, the examiners best interpretation of the claims of the instant application is as follows. The claims of the instant application are drawn to a method of separating sugars and non-sugars from a solution comprising passing the solution through at least one weak acid cation exchange column and at least one strong acid cation exchange column wherein the resin is in the form of a salt and is crosslinked with divinyl benzene (DVB) wherein the crosslinking degree of the resin is 3%-8% by weight and the particle size of the resin is 10 μ m to 2000 μ m. Products to be isolated are betaine, inositol, mannitol, sucrose, erythritol, glycerol, and/or amino acids and the solution to be treated in the chromatographic column is a sugar beet solution (vinasse, molasses, or betaine molasses). The eluent used in the column is water in a temperature of between 10°C-95°C. Additionally, there is optionally a concentration or filtration unit arranged between the columns, wherein the solution is concentrated by evaporation. The chromatographic separation can be a simulated moving bed process (either continuous or sequential) or a batch process and the feed solution has a pH of from 6-11.

Heikkilä et al. teaches of a process of separating betaine from the sugars and nonsugars of beet molasses by a chromatographic process (column 2, lines 7-10). The column contains a strong cation exchange in alkali form wherein sodium is generally the preferred alkali form and the elution material is generally water at 60°C-90°C (column 2, lines 39-46). The resin is preferably a sulphonated polystyrene exchange resin crosslinked with from about 2 to about 12 percent and preferably 3-9 percent weight divinylbenzene (DVB) wherein they have a uniform

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particle size of about 0.2mm-0.5mm (200 μ m -500 μ m). The feed is preferably a betaine-containing beet molasses, a rest molasses, or vinasse (column 2 lines 47-60). The elution material is recovered as a first nonsugar waste fraction, a second sugar containing fraction, and a third containing betaine. The nonsugar and sugar fractions are then subjected to further treatments to recover the remaining materials (column 2, lines 62-69). Betaine is then recovered by evaporation and crystallization (column 3, lines 39-47). Heikkilä et al. also teach that multiple chromatographic steps may be preformed to obtain the desired compounds (column 4, lines 17-29).

What is not taught by Heikkilä et al. is to use a weak acid ion exchange column additionally in the process.

Various products are known in the art to be obtained at various pHs and to be eluted at various rates in a chromatographic column based on the properties of the column and compound eluted. It would be obvious to one of ordinary skill in the art at the time the invention was made to add an additional chromatographic column which has different properties than the first column to purify a solution which has multiple compounds which would react similarly to the first column and be eluted at similar rates. One would be motivated to have a multi column system and or a column with various zones which have different properties, such as ionic strength, to separate various compounds which are in the same solution.

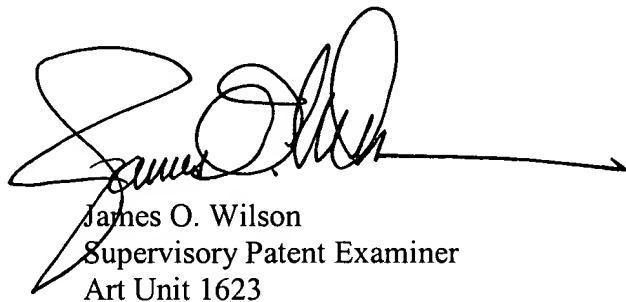
Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Traviss McIntosh whose telephone number is 703-308-9479. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James O. Wilson can be reached on 703-308-4624. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.



James O. Wilson
Supervisory Patent Examiner
Art Unit 1623

Traviss C. McIntosh
November 14, 2002